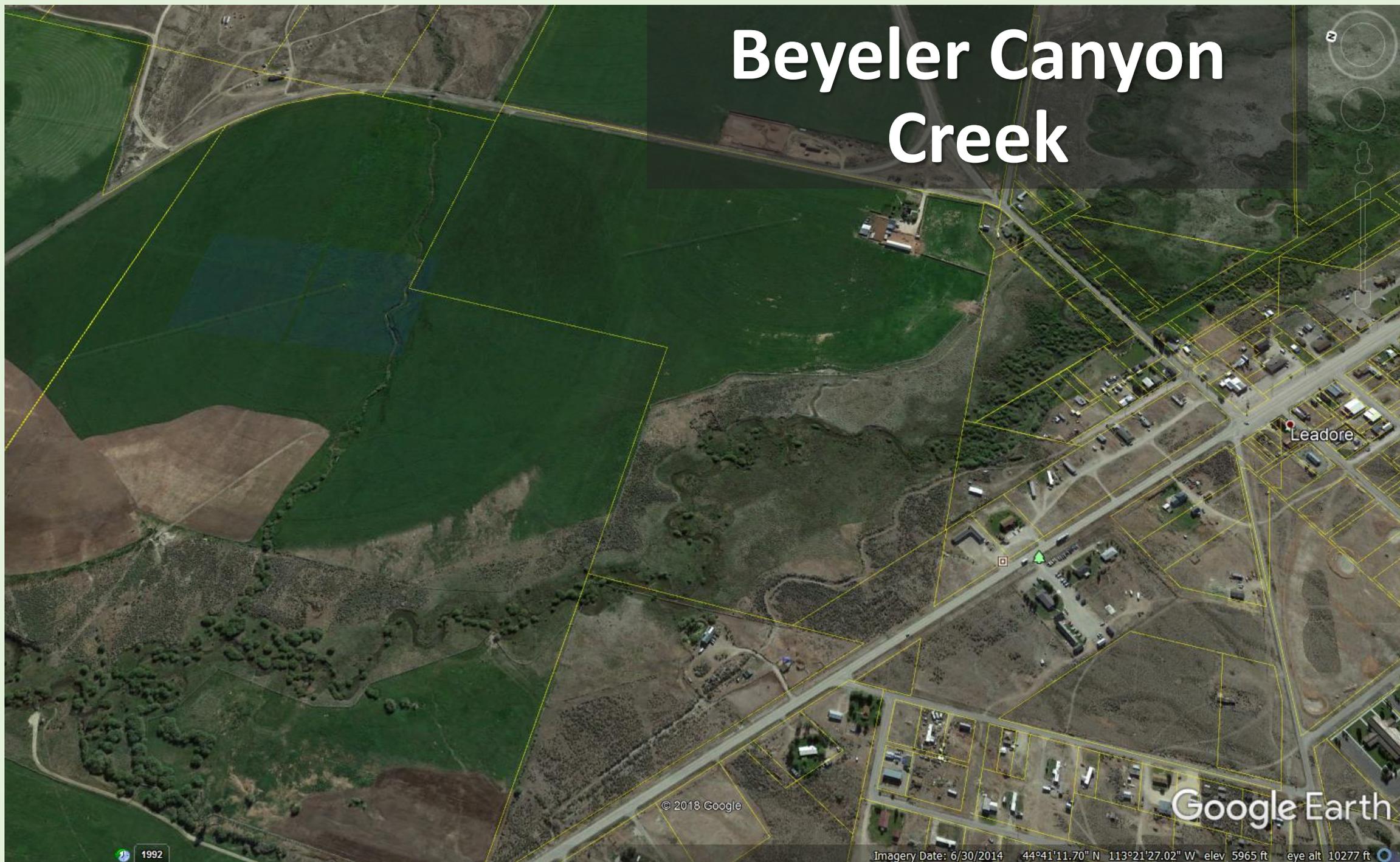


Beyeler Canyon Creek



Leadore

© 2018 Google

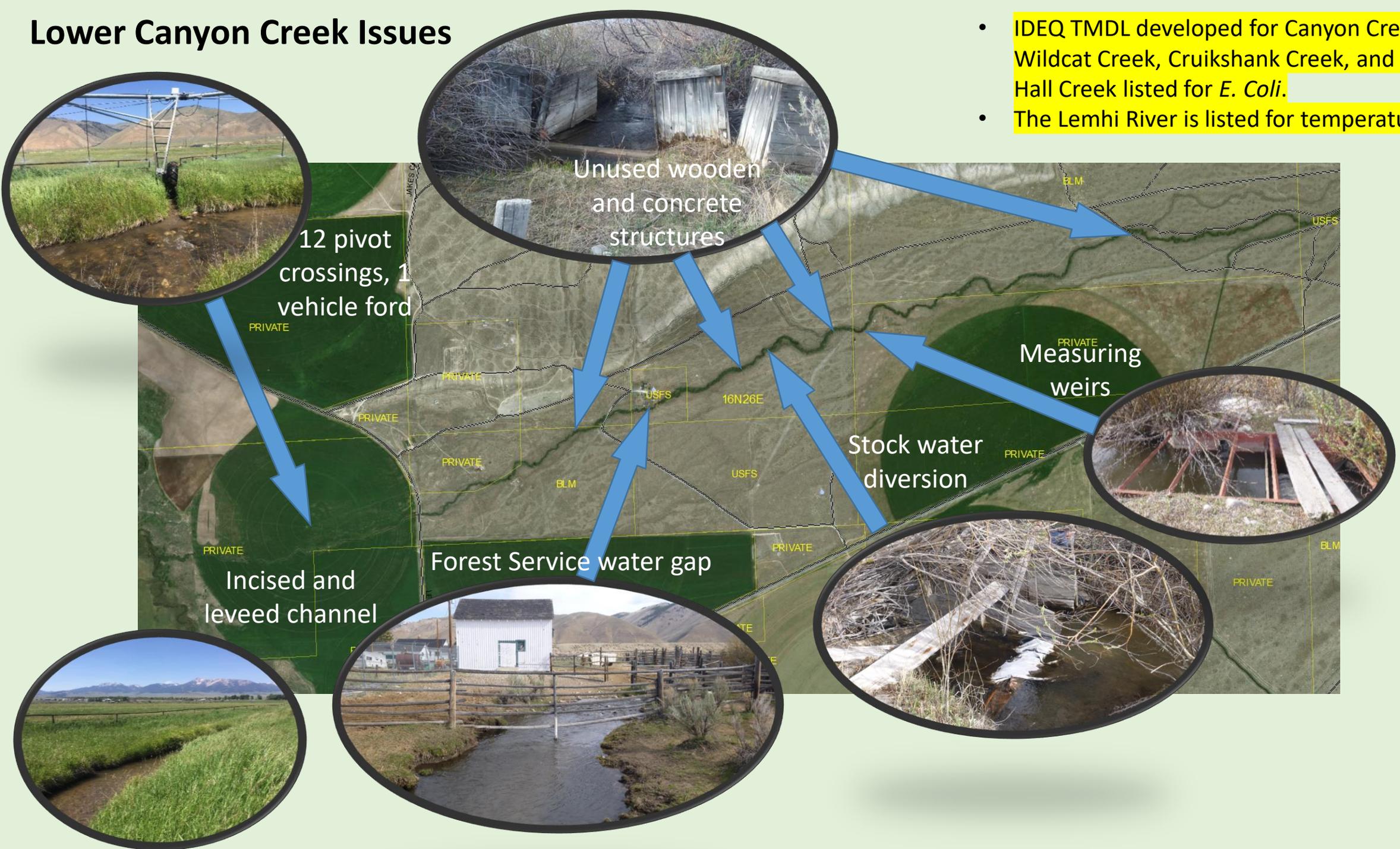
Google Earth

1992

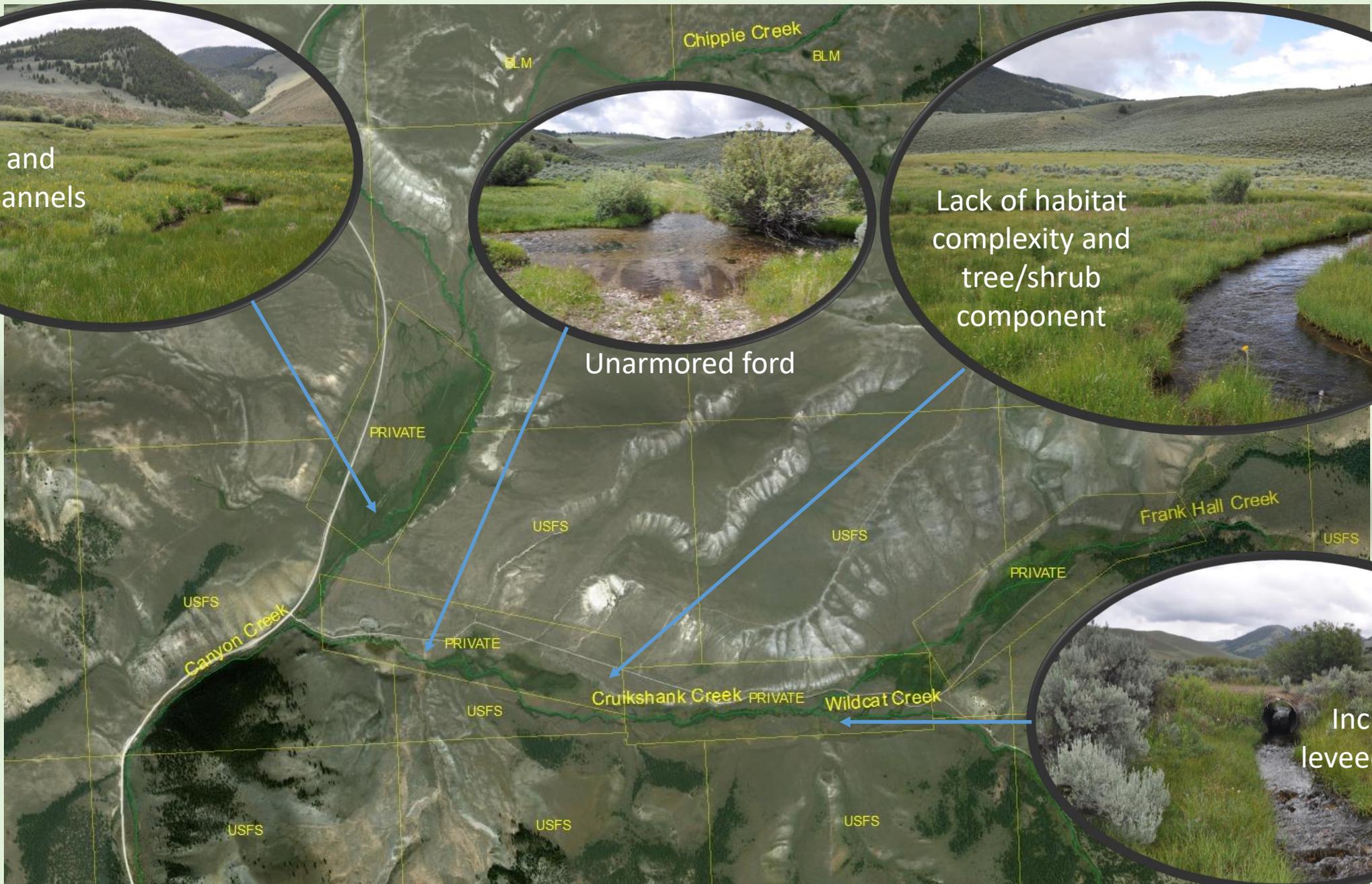
Imagery Date: 6/30/2014 44°41'11.70" N 113°21'27.02" W elev 5965 ft eye alt 10277 ft

Lower Canyon Creek Issues

- IDEQ TMDL developed for Canyon Creek, Wildcat Creek, Cruikshank Creek, and Frank Hall Creek listed for *E. Coli*.
- The Lemhi River is listed for temperature.



Upper Canyon Creek Issues



Incised and leved channels

Unarmored ford

Lack of habitat complexity and tree/shrub component

Incised and leved channels

Existing Condition for Canyon Creek single pivot



- Vehicle Ford
- Pivot Crossing
- Pivot boundary
- Pivot arm

0 0.125 0.25 0.5 Miles



Reducing sediment and nutrient loads in Canyon Creek and the Lemhi River

Best Management Practice Load Reduction

Estimations provided by Amanda Laib, Idaho DEQ

Project Component	Calculation/Estimation Method	Annual Load Reduction Estimate
Center to half pivot conversion and streambank stabilization	Direct Volume Calculation	<ul style="list-style-type: none">• Sediment = 168 ton• Nitrogen = 485 lb• Phosphorus = 243 lb
Off-stream livestock water supply, beaver dam analogs and exclusion fencing	STEPL Model	<ul style="list-style-type: none">• Sediment = 7 ton• Nitrogen = 112 lb• Phosphorus = 17 lb
Total Estimated Load Reduction		<ul style="list-style-type: none">• Sediment = 175 ton• Nitrogen = 597 lb• Phosphorus = 260 lb

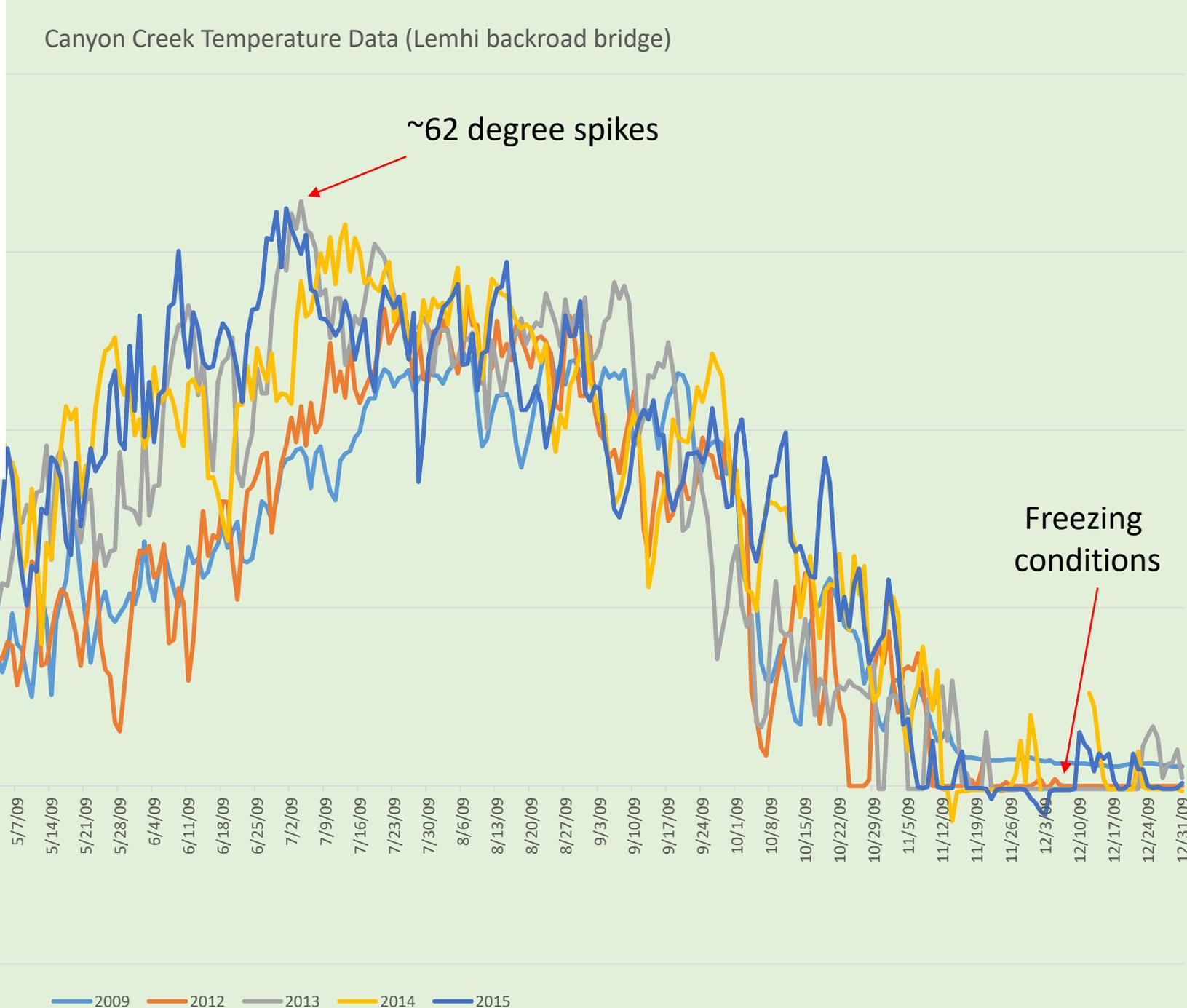
Canyon Creek Temperature Data (Lemhi backroad bridge)

Abby Tillotson



Stream temperature can affect development of Chinook salmon. The five salmon fry above are from the same family and emerged on the same day, but, as eggs, were exposed to different temperature treatments.

20
15 C = 59 F
10 C = 50 F
5 C = 41 F
0
-5



~62 degree spikes

Highly variable fluctuations

Freezing conditions

— 2009 — 2012 — 2013 — 2014 — 2015

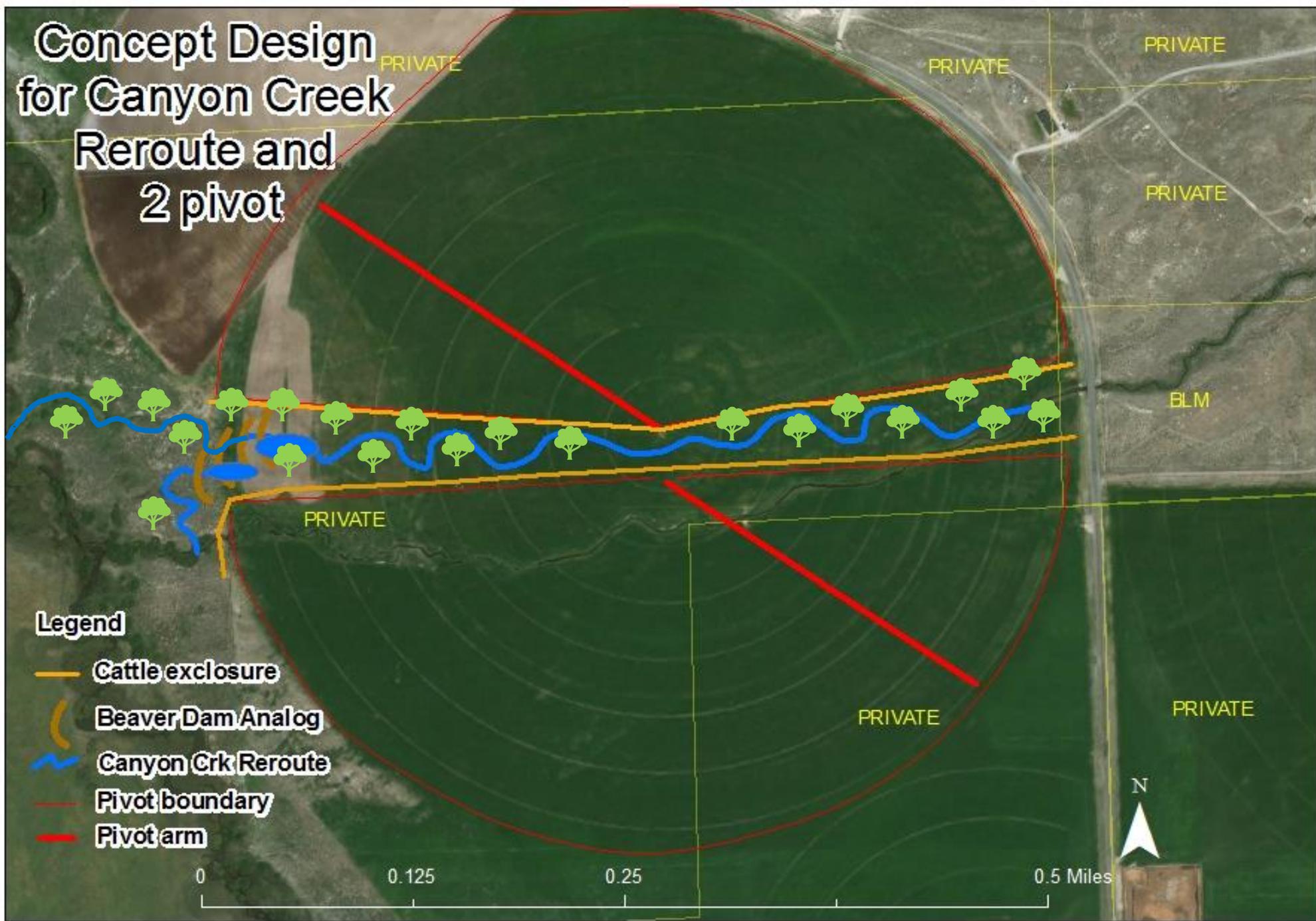
Fish data

- Canyon Creek is Chinook salmon designated critical habitat (DCH)
- Juvenile Chinook salmon have been found in Canyon Creek downstream of LCC-02 diversion
- Two juvenile Chinook salmon have been found upstream of the LCC-02 diversion
- Steelhead/redband/rainbow trout and westslope cutthroat trout occur throughout the watershed
- Resident bull trout are found in Canyon Creek and perennial tributaries upstream of the BLM
- Redband/rainbow/steelhead trout densities were highest in the middle reach of Canyon Creek
- Bull trout were present in both Cruikshank Creek transects
- No bull trout were found in Canyon Creek during the summer or fall sampling periods
- Cutthroat trout were present in the lower, middle, and upper mainstem Canyon Creek and Cruikshank Creek survey sites
- Brook trout were present in low densities

Project objectives

- 1) Reduce *E. coli* bacteria levels in Canyon Creek and lower temperatures flowing into the primary production area of the Lemhi River by restoring the riparian floodplain and providing more opportunity for ground water recharge function in lower Canyon Creek
- 2) Increase juvenile salmon and steelhead rearing habitat by restoring sinuosity, habitat complexity, and revegetating the shrub and tree component of lower Canyon Creek
- 3) Reduce local and watershed related sediment loads by moving center pivot wheel lines, removing the vehicle crossings, and adding BDA's

Concept Design for Canyon Creek Reroute and 2 pivot



Project Benefits and Outcomes

- 1) Improve water quality by restoring the riparian floodplain, excluding cattle and horses from previously heavily used areas, and providing more opportunity for ground water recharge function
- 2) Increase juvenile salmon and steelhead rearing habitat by restoring sinuosity, habitat complexity, and revegetating the shrub and tree component of Canyon Creek
- 3) Improve fish passage and reduce fish entrainment by eliminating fish passage barriers and moving diversions to a screened irrigation network
- 4) Reduce sediment loads by moving center pivot wheel lines, removing the vehicle crossings, and adding BDA's on multiple reaches of Canyon and Cruikshank Creeks
- 5) Reduce stream temperature by revitalizing the floodplain and recharging ground water in Canyon Creek

Indian Creek Irrigation Project

Project objectives

- Close an unscreened ditch known to entrain fish
- Save instream flow through irrigation efficiencies



Project design

June 2019 update

- NRCS 80% design completed
- Cultural Survey completed May 22, 2019
- Funding: USFWS grant/ TU sponsor
- Screened pipeline
- 1 cfs water savings



Google Earth

Playfair Irrigation and Highway 28 Culvert



Project objectives:

1. Remove the double barrel culvert where Little Sawmill Creek goes under Highway 28 and replace it with a natural bed surface open bottom culvert
2. Remove the wooden irrigation diversion on Little Sawmill Creek which is a seasonal fish passage barrier and transfer the water right Point of Diversion from Little Sawmill Creek to L-43B on the Lemhi River
3. Design and build a pipeline/gated pipe to irrigate from the Lemhi River Point of Diversion
4. Install riparian fence on Little Sawmill Creek to reduce sediment, re-establish riparian habitat, and enhance fish passage capability

Problem: Twin culverts under Highway 28

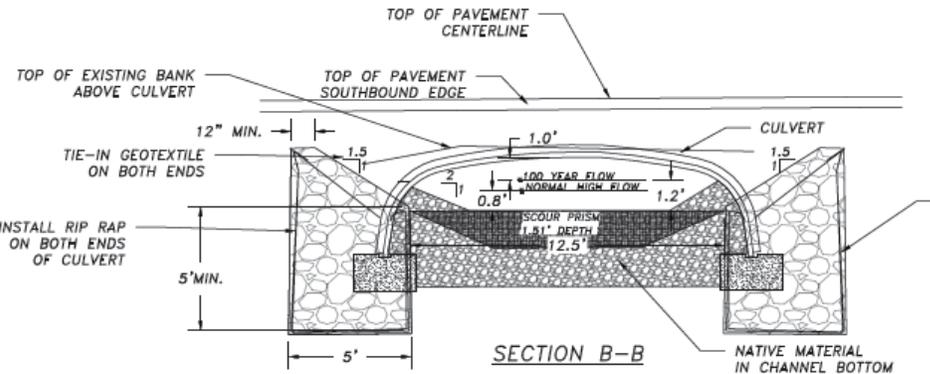
- Slope of both culverts indicate a barrier to juvenile fish



Solution: Install an open bottom culvert with a creek bed consisting of native materials

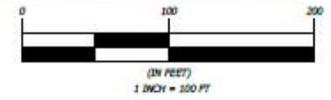
Design was completed in 2018

Landowner and ITD reviewed



**LITTLE SAWMILL CROSSING
CONSTRUCTION SITE**

VOLUME ESTIMATES	CUBIC YARDS
EXCAVATION	893
BACKFILL W/ 1.3 FILL FACTOR	792
ROAD BASE 3/4"	47
PAVEMENT (ACROSS EXCAVATED AREA)	34
LAND OWNER GRAVEL ROAD 3/4" ROAD BASE	34
RIP RAP	40
STREAM GRAVEL	172



Problem: Wooden diversion in Little Sawmill Creek

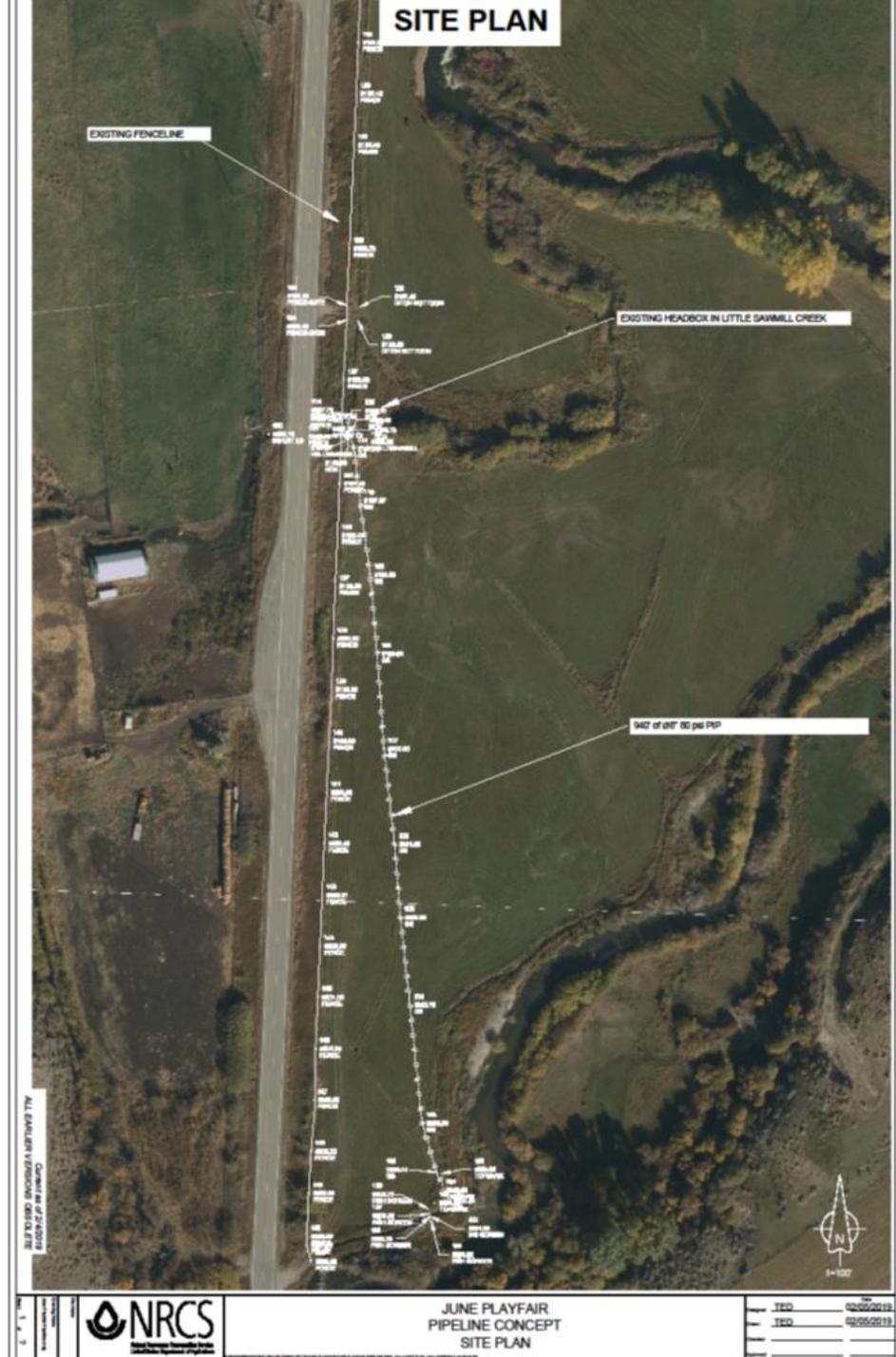
- Constraint and drop of the diversion indicates a seasonal fish barrier



Solution: Move the Point of Diversion from Little Sawmill Creek to the Lemhi River and install ~950 feet of pipe from L-43B to ~600 feet of gated pipe

NRCS Design was completed in 2018

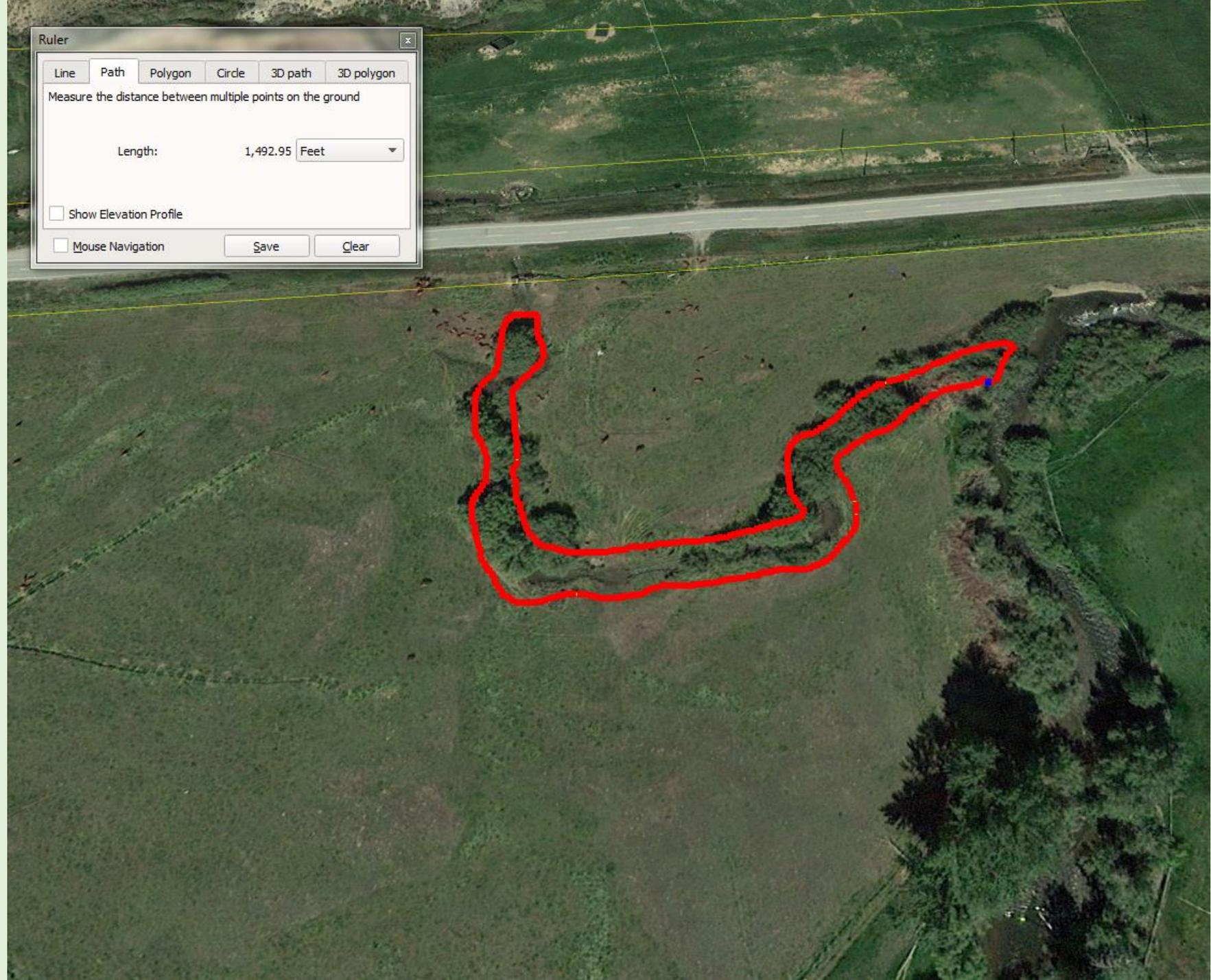
Landowner reviewed



Problem: Sedimentation and bank destabilization from crossings



Solution: ~1,500 feet of riparian fencing from the new extended open bottom culvert to the Lemhi confluence



Fish data

Little Sawmill Creek Project

Electrofishing Results - September 9, 2016

Section 4
No fish captured

Section 1				
Species	Number captured	Minimum length (mm)	Maximum length (mm)	Mean length (mm)
Bridgelip sucker	6	51	78	59.3 (10.1)
Chinook salmon	6	86	104	97.5 (6.4)
Mountain whitefish	1	89	89	--

Section 3				
Species	Number captured	Minimum length (mm)	Maximum length (mm)	Mean length (mm)
Steelhead	1	290	290	--
Mountain whitefish	1	94	94	--

Section 2				
Species	Number captured	Minimum length (mm)	Maximum length (mm)	Mean length (mm)
Chinook	11	91	105	98.5
Steelhead /rainbow trout	5	179	406	257.4 (92.8)

Section 3 2018 update		
Species	#	Size class
Steelhead /rainbow	3	50-200 mm
Bull	1	50-200 mm
Whitefish	1	50-200 mm

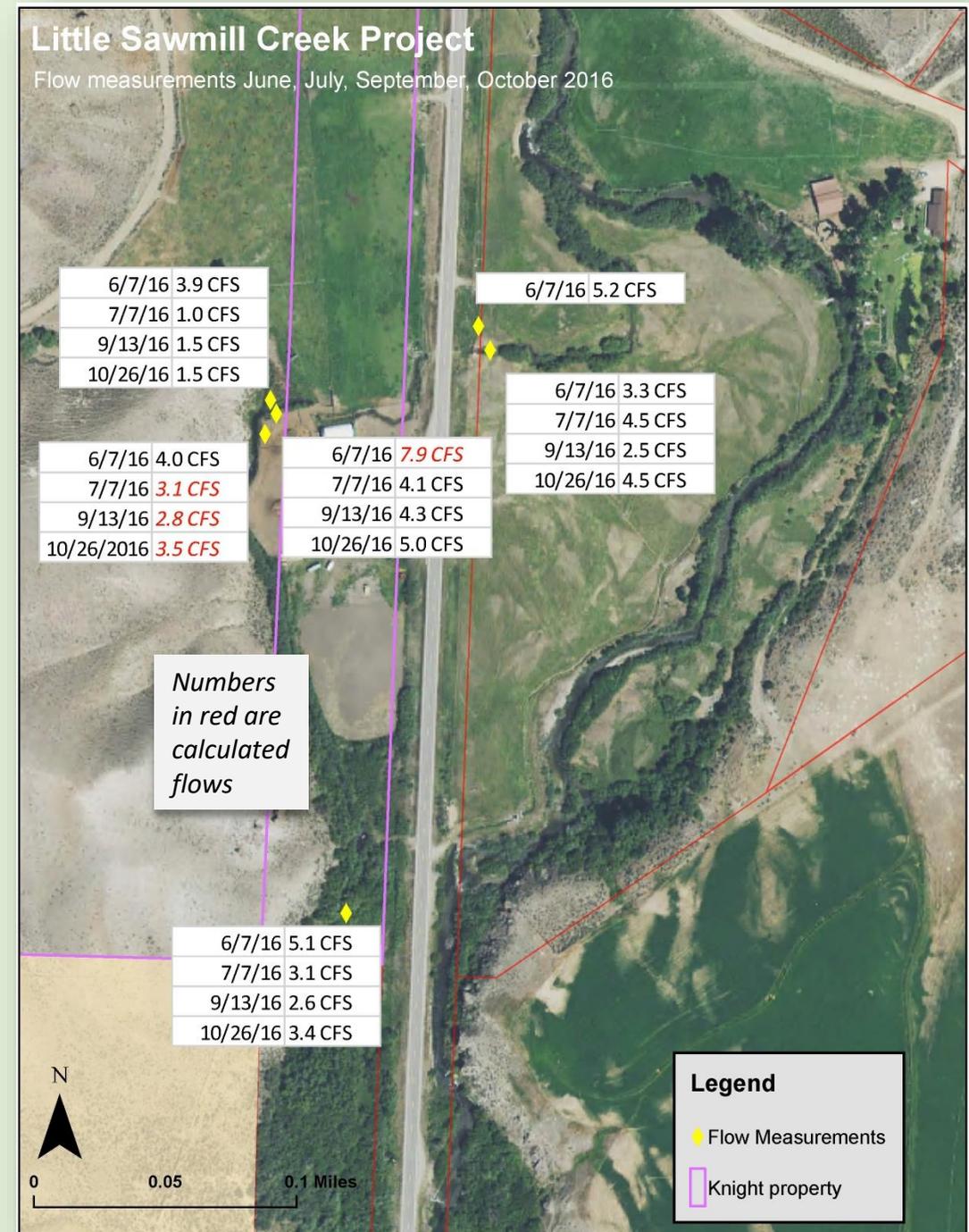
Section 2 2018 update		
Species	#	Size class
Chinook	2	50-200 mm
Steelhead/ rainbow	2	50-200 mm
Whitefish	5	50-200 mm



Temperature and Flow data

Location	Average Max Temp	Average Min Temp
Lemhi	62.4° F	51.7° F
Upper springs	56.6° F	48.6° F
Lower springs	56.2° F	49.6° F

~2.5 to 5 cfs which is
~3 to 6 degrees cooler
than the Lemhi



Project Benefits

- Improve conditions on lower Little Sawmill Creek to encourage fish to enter Indian Springs
- Provide better fish access to nearly 0.8 miles of juvenile rearing habitat in Indian Springs



Beaver Dam Analog Project

Purpose: Create fish habitat, restore riparian habitat, reengage floodplain, reconnect hyporheic exchange

June 2019 update

- Draft permitting submitted to the Salmon BLM for 2020-2024 BDA installations
- Hawley Creek willow planting
- Met with Challis BLM to discuss potential BDA projects in Custer County
- July 16-17 - build 11 more Hawley BDAs
- August 19-21 – build ~30 BDA's in Sulphur Creek
- August 22 Challis Experimental Range Tour to visit Sulphur Creek BDA's and discuss ideas for other Challis area drainages

